AbstractID: 8370 Title: Discrepancy of IMRT dose delivery due to dynamic MLC gravity effect

Purpose: The aim of the present study was to investigate the MLC gravity effect on IMRT dose dynamic delivery at different gantry angles. **Method and Materials:** To investigate the DMLC gravity effect on IMRT dose fluence, 2D ion-chamber matrix (MatriXX) was mounted to Varian 21EX Linac. One individual IMRT dynamic segments were applied by MSS and SW for 6 MV photon beam at five different gantry angles, which were 0° (neutral gravity), 45° (semi-along gravity), 90° (vertical-along gravity), 315° (semi-against gravity) and 270° (against gravity). To test the correlation of leaf speed and gravity, the half MUs for planned dose were delivered for a relative comparison. Strict γ-index (dose difference: 2%, distance to agreement: 2 ㎜) histogram was used for a quantitative analysis of the discrepancy. The dose distribution by MSS under neutral gravity (gantry 0°) with 137 MUs at prescribed dose (45 cGy) point was used as a reference to compare other results. **Results:** The γ-index histograms showed the increased tendency of the dose discrepancy toward the gravity-along direction rather than against directions. The acceptable proportional ranges below 1 of γ-index were 96.2-99.6% (mean: 97.6%), 92.6-93.5% (mean: 93.0%), 90.4-92.6% (mean: 91.3%), 94.6-98.0% (mean: 96.4%), 92.9-96.8% (mean: 95.0%) for neutral, semi-along, vertical-along, semi-against, and vertical-against gravity of MLC positions respectively. It was observed that MSS deliveries were more stable than SW data (unacceptable γ-index range 1.0-2.0: mean 3.6% for MSS, 5.4% for SW). For dose measurement on the prescribed dose point, all measurements showed a good agreement within 1%. **Conclusions:** Our experiment conclusively reveals that the DMLC gravity definitely affects IMRT dose distribution. The effect may impact more severe in gravity along direction and SW, while leaf speed does not influence so much. **Conflict of Interest:** This work was supported by a grant of Seoul R&BD Program (10550).